

WEST

[Help](#)
[Logout](#)
[Interrupt](#)
[Main Menu](#)
[Search Form](#)
[Posting Counts](#)
[Show S Numbers](#)
[Edit S Numbers](#)
[Preferences](#)
[Cases](#)

Search Results -

Terms	Documents
L8 and ((149/\$)!.CCLS.)	88

Database:

[US Patents Full-Text Database](#)
[US Pre-Grant Publication Full-Text Database](#)
[JPO Abstracts Database](#)
[EPO Abstracts Database](#)
[Derwent World Patents Index](#)
[IBM Technical Disclosure Bulletins](#)

Search:

L9

[Refine Search](#)
[Recall Text](#)
[Clear](#)

Search History

DATE: Sunday, December 15, 2002 [Printable Copy](#) [Create Case](#)

Set Name Query
side by side

Hit Count Set Name
result set

DB=USPT,PGPB; PLUR=YES; OP=OR

<u>L9</u>	L8 and ((149/\$)!.CCLS.)	88	<u>L9</u>
<u>L8</u>	(restraint or air adj bag) and non-azide	150	<u>L8</u>
<u>L7</u>	L5 and ((149/\$)!.CCLS.)	7	<u>L7</u>
<u>L6</u>	(restraint or air adj bag) and (two near part) same fuel	18	<u>L6</u>
<u>L5</u>	(restraint or air adj bag) and (two near part)	2596	<u>L5</u>
<u>L4</u>	hydrotalcite and ((149/\$)!.CCLS.)	3	<u>L4</u>
<u>L3</u>	L1 not L2	26	<u>L3</u>
<u>L2</u>	L1 and (micron or particle adj size)	17	<u>L2</u>
<u>L1</u>	low near fuel and ((149/\$)!.CCLS.)	43	<u>L1</u>

WEST[Help](#)[Logout](#)[Interrupt](#)[Main Menu](#)[Search Form](#)[Posting Counts](#)[Show S Numbers](#)[Edit S Numbers](#)[Preferences](#)[Cases](#)**Search Results -**

Terms	Documents
L9 and ((149/\$)!.CCLS.)	6

Database:

[US Patents Full-Text Database](#)
[US Pre-Grant Publication Full-Text Database](#)
[JPO Abstracts Database](#)
[EPO Abstracts Database](#)
[Derwent World Patents Index](#)
[IBM Technical Disclosure Bulletins](#)

Search:

L10

[Refine Search](#)[Recall Text](#)[Clear](#)**Search History**
DATE: Sunday, December 15, 2002 [Printable Copy](#) [Create Case](#)
Set Name Query

side by side

Hit Count Set Name

result set

DB=USPT,PGPB; PLUR=YES; OP=OR

<u>L10</u>	L9 and ((149/\$)!.CCLS.)	6	<u>L10</u>
<u>L9</u>	silicon adj nitride and (air adj bag or airbag or restraint)	393	<u>L9</u>
<u>L8</u>	L2 and silicon adj nitride	2	<u>L8</u>
<u>L7</u>	L4 and silicon adj nitride	0	<u>L7</u>
<u>L6</u>	L5 and silicon adj nitride	0	<u>L6</u>
<u>L5</u>	L3 and ((149/\$)!.CCLS.)	41	<u>L5</u>
<u>L4</u>	L3 and (air adj bag or airbag or restraint)	55	<u>L4</u>
<u>L3</u>	L2 same l1	57	<u>L3</u>
<u>L2</u>	5at or aminotetrazole	585	<u>L2</u>
<u>L1</u>	guanidine adj nitrate	360	<u>L1</u>

WEST

Generate Collection

Print

L5: Entry 37 of 41

File: USPT

May 21, 1996

DOCUMENT-IDENTIFIER: US 5518054 A

TITLE: Processing aids for gas generants

Brief Summary Text (10):

The gas generant formulations may be formulated with any known fuel. Most airbags today use an azide, particularly sodium azide as fuel. However, there is a desire to get away from the use of azide fuels and a number of other fuels have been proposed, including tetrazoles, such as 5-aminotetrazole, tetrazole, bitetrazole, metal salts of tetrazoles; 1,2,4-triazole-5-one, 3-nitro 1,2,4-triazole-5-one and metal salts of triazoles; dicyanamide; dicyandiamide; nitrates, such as guanidine nitrate, aminoguanidine nitrate, diaminoguanidine nitrate, semicarbazide nitrate, triaminoguanidine nitrate, ethylenediamine dinitrate and hexamethylene tetramine dinitrate. The fuel will typically comprise between about 15 and about 70 wt % of the gas generant composition. The oxidizer will typically comprise between about 20 and about 80 wt % of the gas generant composition.

Detailed Description Text (10):

A gas generant formulation of 71.08 wt % CuO, 12.00 wt % guanidine nitrate, 16.92 wt % 5-aminotetrazole (5AT) was prepared. Based on the weight of the generant formulation, release agent was added per table 4 below. The formulation was pressed in a Carver press at 40,000 psi and release forces were measured.

Current US Original Classification (1):149/35

WEST

[Help](#)
[Logout](#)
[Interrupt](#)
[Main Menu](#)
[Search Form](#)
[Posting Counts](#)
[Show S Numbers](#)
[Edit S Numbers](#)
[Preferences](#)
[Cases](#)

Search Results -

Terms	Documents
L3 and ((149/\$)!.CCLS.)	41

Database:

[US Patents Full-Text Database](#)
[US Pre-Grant Publication Full-Text Database](#)
[JPO Abstracts Database](#)
[EPO Abstracts Database](#)
[Derwent World Patents Index](#)
[IBM Technical Disclosure Bulletins](#)

Search:

L5

[Refine Search](#)
[Recall Text](#)
[Clear](#)

Search History

 DATE: Sunday, December 15, 2002 [Printable Copy](#) [Create Case](#)

Set Name Query

side by side

Hit Count Set Name

result set

DB=USPT,PGPB; PLUR=YES; OP=OR

<u>L5</u>	L3 and ((149/\$)!.CCLS.)	41	<u>L5</u>
<u>L4</u>	L3 and (air adj bag or airbag or restraint)	55	<u>L4</u>
<u>L3</u>	L2 same l1	57	<u>L3</u>
<u>L2</u>	5at or aminotetrazole	585	<u>L2</u>
<u>L1</u>	guanidine adj nitrate	360	<u>L1</u>

END OF SEARCH HISTORY

WEST

Generate Collection

Print

L5: Entry 34 of 41

File: USPT

May 26, 1998

DOCUMENT-IDENTIFIER: US 5756929 A

TITLE: Nonazide gas generating compositions

Detailed Description Text (17):

A mixture of 5-aminotetrazole (SAT), guanidine nitrate, and strontium nitrate was prepared having the following composition in percent by weight: 25.00% SAT, 25.00% guanidine nitrate, and 50.00% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with a fuse and a small ignition charge of Dupont 4227 smokeless powder, the composition burned thoroughly leaving a hard, porous klinker like residue which is easily filterable. The pH of an 800 ml aqueous rinse was 11.

Detailed Description Text (29):

A mixture of SAT, guanidine nitrate, and strontium nitrate was prepared having the following composition in percent by weight: 23.26% SAT, 16.08% guanidine nitrate, and 60.66% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with a fuse and a small ignition charge of Dupont 4227 smokeless powder, the mixture burned smoothly and completely and left a hard porous klinker like residue which is readily filterable.

Detailed Description Text (35):

A mixture of SAT, guanidine nitrate, and strontium nitrate was prepared having the following composition in percent by weight: 20.60% SAT, 24.12% guanidine nitrate, and 55.28% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with a fuse and a small ignition charge of Dupont 4227 smokeless powder, the mixture burned smoothly and completely and left a hard porous klinker like residue which is readily filterable. The pH of an 800 ml aqueous rinse was 11.

Detailed Description Text (41):

A mixture of SAT, guanidine nitrate, and strontium nitrate was prepared having the following composition in percent by weight: 26.79% SAT, 12.49% guanidine nitrate, and 60.72% strontium nitrate. The powders were ground separately and dry blended. When ignited at atmospheric pressure with a propane torch, the composition burned completely forming a hard residue which was somewhat porous and readily filterable.

Detailed Description Text (44):

A mixture of SAT, guanidine nitrate, and strontium nitrate was prepared having the following composition in percent by weight: 16.19% SAT, 23.24% guanidine nitrate, and 60.57% strontium nitrate. The powders were ground separately and dry blended. When ignited with only a fuse, fuse and Dupont 4227 smokeless powder, or a propane torch, the composition burned to completion leaving a hard porous readily filterable klinker like residue.

Detailed Description Text (56):

A mixture of 5-aminotetrazole, guanidine nitrate, nitroguanidine and strontium nitrate was prepared having the following composition in percent by weight: 16.47% 5-aminotetrazole, 11.82% guanidine nitrate, 10.08% nitroguanidine, and 61.63% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with only a fuse, or fuse and Dupont 4227 smokeless powder, the composition burned to completion leaving a hard porous readily filterable klinker like residue. Ignition with only a propane torch was marginal. The pH of a 800 ml aqueous rinse was 7-8.

Detailed Description Text (59):

A mixture of 5-aminotetrazole, guanidine nitrate, nitroguanidine and strontium nitrate was prepared having the following composition in percent by weight: 11.56% 5-aminotetrazole, 16.60% guanidine nitrate, 14.15% nitroguanidine, and 57.69% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with only a fuse, or fuse and Dupont 4227 smokeless powder, the composition burned to completion leaving a hard porous readily filterable klinker like residue. Ignition with only a propane torch was marginal. The pH of a 800 ml aqueous rinse was 7-8.

Detailed Description Text (71):

A mixture of guanidine nitrate, 5-aminotetrazole, potassium perchlorate, and strontium nitrate was prepared having the following composition in percent by weight: 19.90% guanidine nitrate, 22.40% 5-aminotetrazole, 14.70% potassium perchlorate, and 43.00% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with a fuse and Dupont 4227 powder, the composition burned rapidly to completion with an audible roar leaving a hard solid mass on completion of combustion.

Detailed Description Text (80):

A mixture of guanidine nitrate, 5-aminotetrazole, potassium chlorate, and strontium nitrate was prepared having the following composition in percent by weight: 19.90% guanidine nitrate, 22.40% 5-aminotetrazole, 20.00% potassium chlorate, and 37.70% strontium nitrate. These powders were ground separately and dry blended. When ignited at atmospheric pressure with a fuse and Dupont 4227 smokeless powder, the composition burned quickly and erratically.

Detailed Description Text (81):

The foregoing examples demonstrates that a significant increase in nontoxic gas output is realized at acceptable and comparable flame temperatures when compared with a very high gas output state of the art baseline composition containing 5-aminotetrazole and strontium nitrate. The substitution of guanidine nitrate for the baseline 5-aminotetrazole fuel component (Examples 11-13) results in a much higher gas mass fraction. This allows a lower weight and volume of propellant to be required in a volume-limited application. In addition because of the decreased concentration of particulates formed during the decomposition fewer solids need to be filtered out of the gas stream. It will also be apparent to those skilled in the art that insignificant levels of toxic gases such as nitrogen oxides and carbon monoxide are formed during the combustion by the preferred compositions without the use of a catalyst as shown by the foregoing examples.

Detailed Description Text (82):

Even when the 5-aminotetrazole fuel of the stoichiometric baseline nonazide composition is only partially substituted with guanidine nitrate (Examples 2, 3, 4 and 5 of Table 1), a significant increase in the gas mass fraction and moles of gas results at comparable flame temperatures. The same result is also accomplished by substituting nitroguanidine alone (Examples 1-5 of Table 3) or in combination with guanidine nitrate for the baseline aminotetrazole component (Examples 17 and 18). Again a significant improvement in gas yield results at slightly higher but acceptable flame temperatures. The flame temperature can also be reduced by substitution of more guanidine nitrate for nitroguanidine with essentially no change in gas fraction or yield. The use of nitroguanidine and/or nitroaminoguanidine is attractive for increasing the overall density of the gas generant composition for use in volume limited applications. In addition, when nitroguanidine is used as the fuel constituent, the flame temperature of the gas generant composition is significantly lower at a comparable molar gas output when compared to the state of the art 5-aminotetrazole based composition. When the aminotetrazole fuel of the baseline composition is partially substituted with nitroguanidine or a combination of nitroguanidine and guanidine nitrate, a significant increase in the moles of gas per 100 g of propellant at comparable flame temperatures results (Examples 6 and 7).

Detailed Description Text (83):

It has also been discovered that when nitroguanidine is incorporated into all of the experimental gas generant compositions used as examples of this invention, that the ignitability of the compositions is greatly improved as well as the burning rate. In addition to a significant increase in gas yield and moles of gas formed, when compared with either prior art azide or nonazide gas generant compositions, the use of combinations of guanidine nitrate and nitroguanidine or nitroaminoguanidine with 5-aminotetrazole as a multiple constituent fuel for the gas generant allows greater precision for tailoring the burning rate, burning rate pressure exponent, ignitability,

and the amount and physical form of the slag and clinkers produced on combustion. The use of a multiple ingredient fuel containing constituents with different densities such as guanidine nitrate and/or nitroguanidine and/or nitroaminoguanidine and/or 5-aminotetrazole as described in the examples of this invention further allows a greater capability for tailoring and adjusting the resultant gas generant composition density while maintaining the required reactant stoichiometry, as that exhibited with prior art singular fuels.

Detailed Description Paragraph Table (1):

TABLE 1	EXAMPLES 1 2 3 4 5				
	<u>5-aminotetrazole</u>				
<u>Guanidine nitrate</u>	--	23.24	32.40	29.26	39.00
<u>Nitroguanidine</u>	--	--	--	--	--
<u>Nitroaminoguanidine</u>	--	--	--	--	--
Stoichiometric system	yes	yes	yes	yes	no
Flame temp., Chmbr, .degree.K.	2089	2124	2136	2208	2248
NO.sub.2, Chmbr/Exh, %	.008/0	.005/0	.004/0	.004/0	.003/0
CO, Chmbr/Exh, %	.014/0	.025/0	.028/0	.165/0	.215/0
Nitrogen, Exh, %	50.73	45.25	43.42	45.66	43.97
Oxygen, Exh, %	12.55	8.57	7.24	8.45	7.08
CO.sub.2, Exh, %	22.75	23.87	24.24	24.61	25.23
Water Vapor, Exh, %	13.97	22.32	25.10	23.24	26.33
Gas Mass Fraction, Exh, %	65.04	70.34	71.47	72.37	74.81
Moles of Gas/100g, Exh	2.27	2.57	2.73	2.68	2.81

Detailed Description Paragraph Table (2):

TABLE 2	EXAMPLES 6 7 8 9				
	<u>5-aminotetrazole</u>				
<u>Guanidine nitrate</u>	11.82	16.60	--	--	--
<u>Nitroguanidine</u>	10.08	14.15	--	--	--
<u>Nitroaminoguanidine</u>	--	--	21.45	28.60	Strontium nitrate
Stoichiometric system	yes	yes	yes	yes	Flame temp., Chmbr, .degree.K.
2193	2227	2236	2287	NO.sub.2, Chmbr/Exh, %	.005/0
.006/0	.008/0	.007/0	CO, Chmbr/Exh, %	.052/0	.064/0
.067/0	.085/0	Nitrogen, Exh, %	46.32	44.84	48.12
47.25	Oxygen, Exh, %	8.53	7.19	11.25	10.28
CO.sub.2, Exh, %	24.54	25.13	24.08	24.52	Water Vapor, Exh, %
20.46	22.62	18.25	19.67	Gas Mass Fraction, Exh, %	72.55
72.55	70.99	72.97	Moles of Gas/100g, Exh	2.66	2.66
2.47	2.53				

Detailed Description Paragraph Table (11):

TABLE 5										
AIRBAG PROPELLANT SCIENTIFIC ANALYSIS - LTS/ASL010596-1 Baseline LTS-5 LTS-3 LTS-7 LTS-12 LTS-13 LTS-11 LTS-15 LTS-16 LTS-18 LTS-1 1 2 3 4 5 6 7 8 9 10										
<hr/>										
5-Aminotetrazole 28.60 25 16.19 26.79 20.60 23.26 16.47 11.56 25.00 25.00 Guanidine										
nitrate -- 25 23.24 12.49 24.12 16.08 11.82 16.60 10.00 20.00 Nitroguanidine -- -- --										
-- -- -- 10.08 14.15 10.00 5.00 Strontium nitrate 71.40 50 60.57 60.72 55.28 60.66										
61.63 57.69 55.00 50.00 Stoichiometric system YES -- YES -- -- -- YES YES -- -- Flame										
Temp., Chmbr, .degree.K. 2089 2430 2124 2482 2472 2371 2190 2225 2598 2454 NO.sub.2,										
Chmbr/Exh, % .008/0 0/0 005/0 .002/0 001/0 004/0 006/0 005/0 0/0 0/0 CO, Chmbr/Exh, %										
.014/0 4.83/2.66 .025/0 .42/0 .55/0 .17/0 .038/0 .054/0 2.29/1.60 6.75/38 Nitrogen,										
Exh, % 50.73 51.21 45.25 50.98 48.46 49.16 46.64 45.14 51.78 51.74 Oxygen, Exh, % 12.55										
0.00 8.57 2.90 13.91 4.84 8.96 7.66 0.00 0.00 CO.sub.2, Exh, % 22.75 23.52 23.87 26.13										
26.53 25.36 24.41 25.01 25.91 23.40 Water Vapor, Exh, % 13.97 21.31 22.32 19.98 23.61										
20.64 19.99 22.19 20.59 20.55 Gas Mass Fraction, Exh, % 65.04 75.52 70.34 70.27 72.93										
70.30 69.82 71.75 73.07 75.52 Moles of Gas/100 g, Exh 2.27 2.93 2.57 2.54 2.69 2.55										
2.52 2.62 2.70 2.93 RESULT OF TESTS AT ATMOSPHERIC PRESSURE (5 GM SAMPLE): Ignition,										
fuse ++ # + + + + ++ + Ignition, booster ++ + + ++ ++ ++ + ++ + Ignition, Propane										
Torch + # # ++ ++ # # # Burn to completion + + + + + + + ++ ++ Klinker formation +										
+ + + + + ++ ++ pH 800 ml aqueous rinse 7-8 11 11 7-8 7-8 9-11 12-13										
<hr/>										
positive + = positive # = neutral										
++ = very										

++ = very positive + = positive # = neutral

Current US Original Classification (1):

149/22

Current US Cross Reference Classification (1):

149/36

Current US Cross Reference Classification (2):

149/45

Current US Cross Reference Classification (3):

149/61

WEST

Help

Logout

Interrupt

Main Menu

Search Form

Posting Counts

Show S Numbers

Edit S Numbers

Preferences

Cases

Search Results -

Terms	Documents
micron same guanidine adj nitrate	9

Database:

US Patents Full-Text Database

US Pre-Grant Publication Full-Text Database

JPO Abstracts Database

EPO Abstracts Database

Derwent World Patents Index

IBM Technical Disclosure Bulletins

Search:

L16

Refine Search

Recall Text

Clear

Search History

DATE: Sunday, December 15, 2002 [Printable Copy](#) [Create Case](#)

Set Name Query

side by side

Hit Count Set Name

result set

*DB=USPT,PGPB; PLUR=YES; OP=OR*L16 micron same guanidine adj nitrate 9 L16L15 L14 and (air adj bag or airbag or restraint) 11 L15L14 L13 and ((149/\$)!.CCLS.) 39 L14L13 50% same micron 9407 L13L12 (5386775| 6074502)! [pn] 2 L12*DB=USPT; PLUR=YES; OP=OR*L11 6074502.pn. 1 L11L10 5872329.pn. 1 L10*DB=USPT,PGPB; PLUR=YES; OP=OR*L9 L8 and ((149/\$)!.CCLS.) 88 L9L8 (restraint or air adj bag) and non-azide 150 L8L7 L5 and ((149/\$)!.CCLS.) 7 L7L6 (restraint or air adj bag) and (two near part) same fuel 18 L6L5 (restraint or air adj bag) and (two near part) 2596 L5L4 hydrotalcite and ((149/\$)!.CCLS.) 3 L4L3 L1 not L2 26 L3L2 L1 and (micron or particle adj size) 17 L2L1 low near fuel and ((149/\$)!.CCLS.) 43 L1

END OF SEARCH HISTORY